DEC STD 205-0 Product Fault Management Specification: General

DOCUMENT IDENTIFIER: A-DS-EL00205-00-0000 Rev A, 10-Jul-1992

ABSTRACT: This document and its related sections define the information required to develop a Product Fault Management Specification. Section -00 provides an overview of the total standard and defines responsibilities. Section -01 defines the format and content. Section -02 provides life cycle development guidelines.

APPLICABILITY: This document applies to all products that are developed or purchased by Digital and will be serviced by Digital Services.

STATUS: APPROVED 10-JUL-1992; use VTX SMC for current status.

This document is confidential and proprietary, and is the property of Digital Equipment Corporation. It is an unpublished work protected under applicable copyright laws.

© Digital Equipment Corporation. 1992. All rights reserved.

DEC STD 205-0 Product Fault Management Specification: General

DOCUMENT IDENTIFIER: A-DS-EL00205-00-0000 Rev A, 10-Jul-1992

REVISION HISTORY:	No previous revision exists.
Document Management Category:	Digital Services Requirements (FR)
Responsible Department:	Digital Services Engineering
Responsible Person:	Mike Robey
SMC Writer:	Ellie DeVries

APPROVAL: This document has been reviewed and recommended for approval by the General Review group for its category.

Mike Robey - Digital Services Engineering

Eric Williams - Standards Process Manager

Direct requests for further information to:

Mike Robey
Use $ VTX ELF for the latest location information.

Use VTX SMC to order copies of this document from Standards and Methods Control. Send distribution questions to JOKUR::SMC or call DTN: 234-4423.

The DIGITAL logo is a trademark of Digital Equipment Corporation.

CONTENTS

1 INTRODUCTION 1
1.1 PURPOSE 2
1.2 SCOPE 3
1.3 RESPONSIBILITIES 3
1.3.1 Development Engineering 3
1.3.2 Digital Services 3
1.3.3 Product Management 3
1.3.4 Manufacturing 4
1.3.5 Marketing 4
2 WAIVERS 4
3 ADVISORY COMMITTEE 4
GLOSSARY 5
Appendix A REFERENCE DOCUMENTS 9
A.1 EL-Class Digital Documents 9
Appendix B RELATED DOCUMENTS 11
B.1 EL-Class Digital Documents 11
B.2 Other Digital Documents 11
B.3 Ordering Information 11

FIGURES

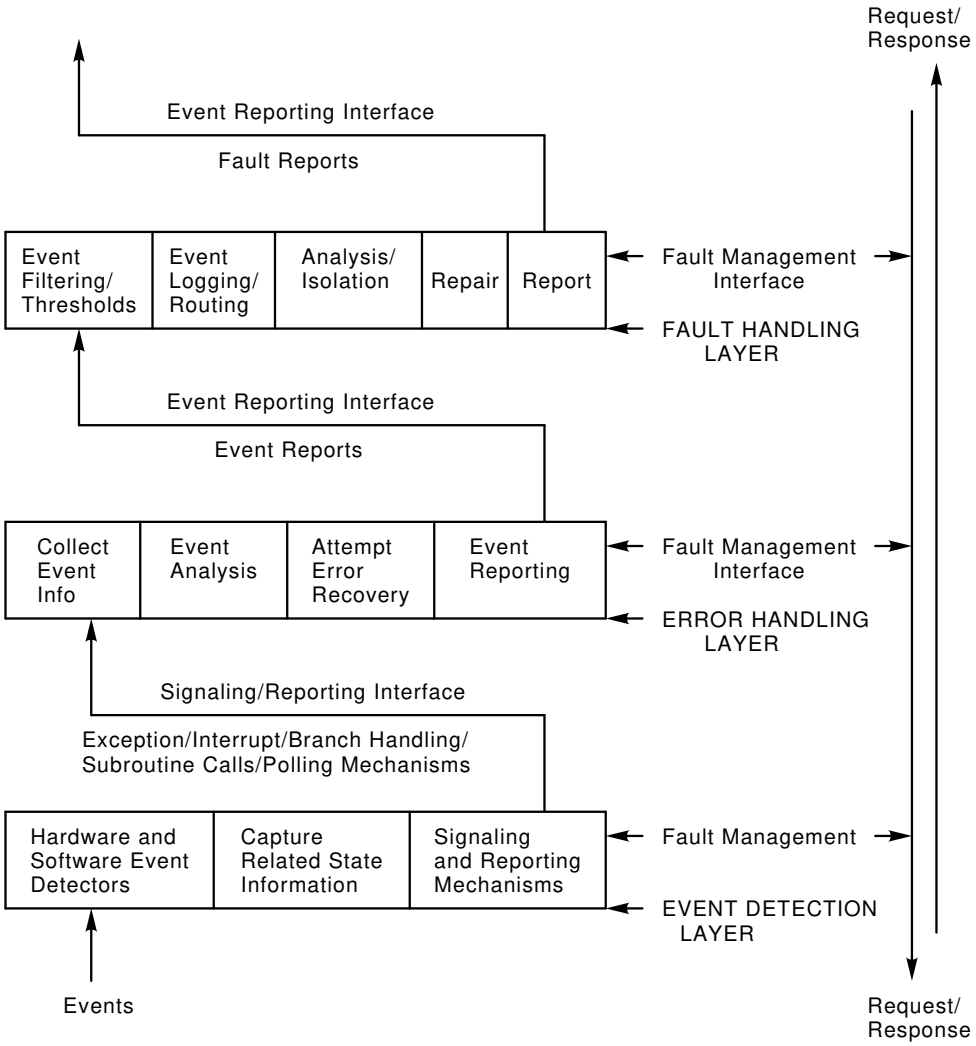
1 Fault Management Architecture Functional Overview 1

1 INTRODUCTION

Section -01 of this standard defines the format and content of a Product Fault Management Specification (PFMS). A PFMS is a design specification that defines the error-detection mechanisms, error handling, and fault handling for each detected error within a product. A PFMS encompasses the entire process of managing faults from their detection to their logical and/or physical removal from the system.

The PFMS is a working document and a reference document. The writer of a PFMS should read both the Generic Fault Management Model (GFMM) and the Digital Enterprise Fault Management Architecture (DEFMA) to gain an understanding of fault management concepts and terminology. The basic functional elements of fault management and the associated interfaces are illustrated in Figure 1.

Figure 1: Fault Management Architecture Functional Overview



The first two sections, Product Description and Fault Management Environment must be written for all products identified in the Scope statement. The product team determines which of the remaining sections need to be written for their product based on the fault management strategy defined in the Fault Management Environment section. If the information for a particular section is contained in the product design specification, then a statement referencing that information could replace that section. The writer of a PFMS for a non Digital product would include the first two sections and all applicable sections that could take advantage of the products serviceability attributes. A PFMS for a non Digital off the shelve product that had no serviceability features might only be a few pages long.

The contents of a PFMS are developed, updated, and used during the phase review process, as defined in *DEC STD 028-00 Phase Review Policy*, by the product team and product support groups. It supports product design, Digital Services, service tool development, documentation, training, debug in development and troubleshooting in the field. A PFMS is developed and maintained under Engineering Change Order (ECO) control.

The Product Fault Management Specification Standard is composed of the following:

- Section 00 — (This section) An introduction that defines the purpose, scope, and format of this standard. This section identifies the functional organizations responsible for developing a PFMS.

  Bibliography—List of related documents.

  Glossary—Definitions of fault management terms.
- Section 01 — The format and content of a hardware PFMS are defined. The information that has to be communicated between the product team members and the end users of the specification is detailed.
- Section 02 — Guidelines for developing a hardware PFMS are provided. The guidelines cover the development process and the timing of deliverables relative to the Phase Review Process.
- Section 03 — (Proposed) The format and content of a software PFMS are defined. The information that has to be communicated between the product team members and the end users of the specification is detailed.
- Section 04 — (Proposed) Guidelines for developing a software PFMS will be provided. The guidelines will cover the development process and the timing of deliverables relative to the Phase Review Process.

1.1 PURPOSE

The Product Fault Management Specifications support the overall Digital Services strategy for managing faults within open system environment. The effective management of fault results increased customer satisfaction and the achievement of Digital Services business objectives. The first two sections of this standard identifies the functional organizations responsible for developing a PFMS and define the type of information required by Digital personnel to support a product. The third section provides life cycle guidelines for writing a Product Fault Management Specification.

1.2 SCOPE

This standard applies to all products that are developed or purchased by Digital and will be serviced by Digital Services.

1.3 RESPONSIBILITIES

The generation of a PFMS is a joint effort by representatives from:

- Development Engineering
- Digital Services
- Product Management
- Manufacturing
- Marketing

When appropriate, it is Product Management's responsibility to expand the Product Team to include additional functions when they are relevant to a project or business area. Additional functions important in the development of a PFMS may include:

- Documentation
- Course Development
- Software Quality Management
- Diagnostic Engineering
- Quality Assurance

Each team member is responsible for working with the developers of a PFMS to ensure that their organizations fault management requirements are included in the PFMS.

1.3.1 Development Engineering

Engineering is responsible for the development of the PFMS. They are also responsible for providing the detailed product fault management information and for ensuring its accuracy. The information should be incorporated into a PFMS, but a pointer to the product engineering specifications may suffice if the information in the engineering specifications conforms to this standard.

1.3.2 Digital Services

A Digital Services reprentative is responsible for assisting with the writing of a PFMS. The representative is also responsible for validating that the service tool implementations match the PFMS.

1.3.3 Product Management

The product manager, with support from other members of the product team, plans for the incorporation of fault management requirements at product inception. The product manager has the final responsibility for ensuring that the product meets the provisions of this standard.

1.3.4 Manufacturing

The manufacturing representative is responsible for ensuring that the fault management features, as specified by engineering, are present in the product. The manufacturing representative ensures that any changes to the product in Phase 4 do not compromise the fault management of the product.

1.3.5 Marketing

The marketing representative is responsible for characterizing the potential end users of the product and their environment. They are responsible for identifying the end-user's serviceability and availability requirements.

2 WAIVERS

If it is necessary that a product or system deviate from the requirements of this standard, a waiver must be obtained in accordance with *DEC STD 066-02 Waivers to Digital Design Standards*.

3 ADVISORY COMMITTEE

An advisory committee exists for this standard and is responsible for collaborating on drafts and reviews of this standard. A current list of members of this advisory committee can be obtained from the standard owner.

GLOSSARY

agent: An active component of an entity that performs management functions on that entity.

algorithm: A finite set of well-defined rules for the solution of a problem in a finite number of steps.

architecture: The design of interfaces and functionality for the implementors that support developing multiple implementations that have to work together to form a system over space and time.

block diagram: A diagram of a system, product, or program in that principle parts are represented by annotated geometrical figures and interconnecting lines.

DEFMA: The Digital Enterprise Fault Management Architecture is an architecture for the management of faults within an enterprise or its components. This architecture describes the components and interfaces needed to implement fault management, including minimal product capabilities and required functions.

data integrity: The quality of data that exists, as long as accidental or intentional malicious destruction, alteration, or loss of data does not occur.

debug: The process of locating, analyzing, and correcting faults.

diagnostic: Any tool, procedure, or activity used to detect and isolate faults.

ECO/FCO: Engineering Change Order/Field Change Order - a formal document used to describe a product change and its related impacts for hardware and system products.

error: Any discrepancy between a computed, observed, or measured quantity and the true, specified, or theoretically correct value or condition.

error class: Describes the properties of a set of similar error conditions.

error/event log: A data set or file in a product or system where error or event information is stored for later access.

error detector: A mechanism used to discover or discern the existence of any discrepancy between a computed, observed, or measured quantity and the true, specified, or theoretically correct value or condition.

error handling: A process of handling a single-error event. This process usually includes attempted error recovery, information capture, and error reporting.

error recovery: The actions taken in response to an error that attempts to properly complete the requested services.

error recovery goal: The percentage of detected errors that invoke error recovery operations.

error type: Describe the nature of an event with respect to its layered architecture, and contains the full class and instance name hierarchy of the entity. A group of errors sharing common traits or characteristics.

event: A significant occurrence or happening.

event report: A data structure that completely describes a single event.

failure: Condition where the delivered service deviates from the specified service. It is the result of a fault.

fault: Erroneous state of hardware or software resulting from failures of hardware components, physical interference from the environment, operator error, incorrect design or software bug. It is considered the underlying cause of an error, although it may or may not be physically identifiable.

fault coverage: The percentage of the product's total failure rate covered by error detection mechanisms.

fault handling: The process used for removing faults from a system.

fault isolation: A process used, following error detection, to gather and analyze symptom data in order to localize the failing component.

fault isolation goal: The probability of isolating a hardware fault to one, two, or more than two FRUs.

fault management: The management of the abnormal operation of a system.

FMI: Fault Management Interface. The interfaces that are used within fault management for signaling and reporting between fault management components, for issuing management directives (requests) to fault managed objects, and for receiving responses from fault managed objects.

fault symptom: A measurable or visible abnormally in an entity parameter.

FRU: Field Replaceable Unit. A unit of a system's structure that can be readily removed and replaced at the customer site.

GFMM: The Generic Fault Management Model describes a generic model of the major concepts and elements of fault management.

module: Generally, a separable logic component. In hardware, this normally equates to a pluggable entity: a device, chip-carrier, PCB. In firmware and software, this refers to a loosely connected functionally defined code block.

packet: A group of bits that includes data, source, and destination addresses.

RAMP: Reliability, Availability, Maintainability Program. The collection of goals, strategies, and requirements specified to ensure product success and profitability in the marketplace from a service viewpoint.

PFMS: Product Fault Management Specification. A design specification that defines the error detection mechanisms, error handling, and fault handling for each detected error within a product.

repair: The removal of a fault from the system. The repair may be physical (such as FRU replacement, software patch), or logical (bad page mapout). It also includes the concepts of repair cleanup, and temporary and permanent repair.

repair agent: The entity that is responsible for repair action.

schematic diagram: A diagram that shows, by means of graphic symbols, the electrical connections and functions of a specific circuit arrangement.

simulation: The representation of selected characteristics of the behavior of one physical or abstract system by another system.

sink: An entity that receives, optionally filters, and processes event reports.

system: An interacting set of subsystems that provide a service to the user. Note the subsystems can be further subdivided to the desired level of detail. In data processing, a collection of people, machines, and methods organized to accomplish a set of specific functions.

test: The operation of a functional unit and comparison of its achieved result with the defined result to establish acceptability.

threshold: The point at which an event or error is considered to be of interest or of significance.

verification: The act of determining whether a design or an operation has been accomplished correctly or has satisfied its specification.

APPENDIX A REFERENCE DOCUMENTS

A.1 EL-Class Digital Documents

EL-Class Number	Document Title
EL-00028-00	*DEC STD 028-0 Phase Review Policy*
EL-00066-02	*DEC STD 066-2 Waivers to Digital Design Standards*

Use VTX SMC to order copies of EL-class documents from Standards and Methods Control. Send distribution questions to JOKUR::SMC or call DTN: 234-4423.

APPENDIX B RELATED DOCUMENTS

B.1 EL-Class Digital Documents

EL-Class Number	Document Title
EL-00003-00	*DEC STD 003-0 Hardware Documentation Standard*
EL-00009-01	*DEC STD 009-1 Product Engineering Specifications: Electrical, Physical, and Environmental Parameters*
EL-00009-02	*DEC STD 009-2 Product Engineering Specifications: Reliability, Availability, and Maintainability Parameters*
EL-00041-00	*DEC STD 041-0 Customer Installability: Product Requirements*
EL-00091-00	*DEC STD 091-0 Product RAMP Requirements*
EL-CS356-00	*Phase Review Process Management: A Services Perspective*
EL-EN522-00	*Digital Qualification Process Manual*
EL-EN522-01	*Storage Systems Qualification Manual*

Use VTX SMC to order copies of EL-class documents from Standards and Methods Control. Send distribution questions to JOKUR::SMC or call DTN: 234-4423.

B.2 Other Digital Documents

Document Number	Document Title
EF-B0659-50	*Generic Fault Management Model*

B.3 Ordering Information

Following are the sources for documents not available from Standards and Methods Control.

Copies of the EF-class document may be obtained from ASDS::ASDS_DCP. Please provide your name, mailstop, and Enet address.

```
+---------------------------------------------------------------------+
|                          READER COMMENTS                            |
|                                                                     |
| Your  comments  and suggestions  will help  Standards and Methods   |
| Control improve their services and documents.                       |
+---------------------------------------------------------------------+
```

Did you request this document? _____ If so, did it arrive within a satisfactory period of time? _____ Please comment.

What are your impressions of this document? Consider format, organization, completeness, readability, and illustrations.

————————————**FOLD ON THIS LINE**———————————————————————— -

Did you find technical or clerical errors in this document? If so, please specify the page number(s) and the error(s).

Are the instructions for the update package clear? _____
Was an index available? _____ If not, is one needed? _____
Do you have other suggestions for improving this document?

The following information is optional:

Name _____ Mailstop _____

Department _____ Node _____

Send your comments to JOKUR::PROJECTS, or fold, staple, and send this page through interoffice mail to:

```
+------------------------------+
|       READERS' COMMENTS      |
| STANDARDS AND METHODS CONTROL |
|           NRO4/D4            |
+------------------------------+
```